



Developed for:
Mutiny Architecture

Outline Fire Safety Strategy Report

Mansfield Heights

Great North Road, London
N2 0NY

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Outline Fire Safety Strategy

Mansfield Heights

Project Reference: AF1733
Client: Mutiny Architecture

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Issue	Date	Description	Author	Checked	Approval
01	18.03.21	First issue for design team review	FHR	VDM	FHR
02	16.12.21	Second issue after authorities’ comments	FHR		FHR
03	13.07.22	Third issue after architectural changes due to existing building constraints	FHR	VDM	FHR
04	15.07.22	Fourth issue after comments from Mutiny	FHR	VDM	FHR
05	02.09.22	Fifth issue after comments from Mutiny	FHR		FHR
06	02.11.22	Sixth issue after comments from planner	FHR		FHR

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The checker has provided an internal review of the technical content of the report.

The approver confirms the report has received quality assurance in accordance with the principles of ISO 9001 and authorises external release of the document on behalf of Ashton Fire.

EXECUTIVE SUMMARY

Ashton Fire have been commissioned by Mutiny Architecture to provide fire safety consultancy services for the proposed residential development at Mansfield Heights, Great North Road, London. This report documents the proposed fire strategy for the development at RIBA Stage 2.

This report outlines the minimum fire safety provisions required for the proposed development to be compliant with the Functional Requirements of the Building Regulations 2010 (as amended).

This report is an outline document only and is not to be submitted as a complete fire strategy document for formal consideration by the approving authorities, however it may be used to form initial discussions with the building control body. The fire strategy is required to be developed during the proceeding design stages.

Apart from where noted in this report, the design will be in accordance with the recommendations of BS 9991 for residential areas and BS 9999 for the non-residential areas. To facilitate ease of review, the key fire safety challenges and / or variations from the prescriptive guidance documents are identified in Summary Table 1, with the fire safety systems outlined in Summary Table 2.

The project is for the refurbishment of residential buildings consisting of apartment units. The existing building consists of a residential apartment building with 7 storeys (G + 6). Each level is provided with two flats which are served by two independent stairs and a lift. One main internal stair, and an additional external stair.

The proposed new building is to maintain its footprint and number of flats per level. It will also contain one additional residential floor also containing only two flats per floor. The flats on this new floor will be suited with gallery spaces accessed via an internal flight of steps. These two flats will be accessed from the new 6th floor level only.

The total number of floors will be seven (G + 6) and will have a finished floor level height of the top-most floor of approximately 17.5m. As the new height will be below 18m, the building will not be equipped with a fire-fighting shaft.

Primary access to the blocks will be via an internal access road off from Great North Road. The fire-fighting stair core will connect all floors.

A 'stay-put' evacuation regime will be utilised for all residential units, which will be provided with individual fire detection and alarm systems. The non-residential areas will operate a simultaneous evacuation strategy and will be provided with a common fire detection and alarm system.

The common residential areas follow single stair guidance for buildings over 11 metres. The access to the flats on the new sixth floor level will be via a smoke vented common corridor. The existing floors will be accessed via an independent protected lobby - one for each flat - which is an enhancement to the current conditions where the main staircase is accessed directly from each flat. The building will be protected throughout with a suppression system.

Non-residential accommodation, i.e. ancillary rooms, are not provided in the building. The plant areas are provided on the roof, on top of floor 6.

It is understood that the adopted London Plan (2021) and Policy D12 is not applicable to this existing building, however, if it were needed, evacuation lifts will be required supported by suitable management procedures. The ADB amendments from May 2022 are also not applicable, as these amendments are to be implemented for planning applications submitted in or after December 2022.

The development will be provided with an automatic suppression system in accordance with latest UK guidance. The structural fire resistance for the building will be of 90 minutes.

Compartmentation will be provided to separate the flats, escape routes and different occupancies. Specific risk areas in the building will also be enclosed within fire resisting construction.

Most units will be flats with entrance halls connected to a common protected corridor served by a stair core. The entrance halls do not need to be fire protected because the flats are protected with a suppression system.

Fire-resisting construction will not be required to mitigate the likelihood of fire spread to neighbouring sites as well as between compartments within the building; this is considering an adequate automatic suppression system will be installed throughout

The main staircase will include a new dry rising main to support hose laying distances.

Fire and rescue service appliances will be provided with access to within 18 m and in sight of the dry riser inlet.

Suitable water supplies will be provided around the site via the fire hydrant system. Hydrants should be provided within 90 m of each of the dry fire main inlets. The location of existing fire hydrants and their operational status is to be confirmed.

Summary Table 1 – Key fire safety strategy challenges

Item	Description	Report Ref.
Draft London Plan	To be determined if the recommendations of the Draft London Plan Policy D12 is applicable to this development, based on planning requirements.	1.3
Firefighting core design in existing floors	The existing floors (GF to 5 th floor) have limitations for implementing an additional partition to separate the lift from the stair enclosure within the new firefighting core.	8.3.10 to 8.3.15

Summary Table 2 – Fire safety systems

Item	Description	Report Ref.
Detection and alarm	Category LD1 to BS 5839-6 in all flats Common areas to be provided with a Category L5 system to BS 5839-1. Communal and plant areas to be provided with a Category L1 system to BS 5839-1.	3.1
Automatic suppression	Residential accommodation - A Category 2 sprinkler system (including the design density in Footnote B) of Table 2) to BS 9251 shall be provided within the apartments.	3.2
Smoke control – Residential areas	An AOV having a free area of at least 1.0 m ² will be provided at the head of the residential common stair.	3.3
Emergency lighting	Provided in accordance with the various British Standards within common residential corridors and stairs, and ancillary areas and commercial areas.	3.5
Fire safety signage	Provided in accordance with the various British Standards within common residential corridors and stairs, and ancillary areas and commercial areas.	3.6
Stand-by power	Back-up power supplies provided in accordance with the relevant British Standard for the various pieces of life-safety equipment.	3.7

Item	Description	Report Ref.
Evacuation lifts	Provision to be determined based on planning and management requirements	3.8
Rising mains	A dry rising main in accordance with BS 9990 shall be provided within the fire-fighting stair.	8

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1. INTRODUCTION

1.1 General

- 1.1.1 Ashton Fire have been commissioned by Mutiny Architecture to provide fire safety consultancy services for the proposed residential development at Mansfield Heights, Great North Road, London. This report documents the proposed fire strategy for the development at RIBA Stage 2.
- 1.1.2 This document is confidential and for the exclusive benefit of Mutiny Architecture. It may not be assigned to or relied upon by a third party without agreement of Ashton Fire in writing. Ashton Fire retains all copyright and other intellectual property in the document and its contents unless transferred by written agreement between Ashton Fire and the Client.
- 1.1.3 This report outlines the minimum fire safety provisions required for the proposed development to be compliant with the Functional Requirements of the Building Regulations 2010 (as amended).
- 1.1.4 This report is an outline document only and is not to be submitted as a complete fire strategy document for formal consideration by the approving authorities, however it may be used to form initial discussions with the building control body. The fire strategy is required to be developed during the proceeding design stages. This document is not intended to portray detailed design information for fire safety systems or construction specifications. As a strategic document supporting and informing the wider design, it should be read in conjunction with the wider project design documentation.
- 1.1.5 It should be noted that any alternative design solutions proposed within this report are subject to agreement and eventual approval by the relevant authorities having jurisdiction (AHJs), which for this project are the building control body (tbc) and the London Fire Brigade (local fire and rescue service).

1.2 Legislation and basis of design

- 1.2.1 Fire safety in buildings is governed by two pieces of legislation in the UK. The Building Regulations 2010, Schedule 1 Part B, Fire Safety applies to building design, whilst for fire safety management in buildings, compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) is required.
- 1.2.2 This strategy has been developed to meet the level of fire safety expected under the Building Regulations 2010 (as amended), namely:
- B1 – Means of warning and escape
 - B2 – Internal fire spread (linings)
 - B3 – Internal fire spread (structure)
 - B4 – External fire spread
 - B5 – Access and facilities for the fire and rescue service
 - Regulation 7 – Materials and workmanship
- 1.2.3 The fire safety strategy will be developed to satisfy the requirements for fire safety as set out by the Building Regulations. The strategy has not been specifically developed to address property protection or insurer's requirements. However, the features that are included for life safety, as required by the Building Regulations 2010, will contribute in some extent to business and property protection.
- 1.2.4 In general, the necessary level of life safety will be achieved utilising BS 9991 [1] for the residential areas and BS 9999 [2] for the non-residential areas, including documents referenced these standards in the first instance, though also incorporating consideration of recent updates to Approved Document B Volume 1 2019 [3] including 2020 amendments [4]. Fire engineering principles are employed to

support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. Unless otherwise stated, it is expected that provisions will be provided according to recommendations of BS 9991 and BS 9999 as appropriate.

- 1.2.5 Departures from the guidance documents are identified and alternative proposals are documented for facilitating review by the project's approvers. In accordance with the fire safety engineering principles detailed in the BS 7974 [5] codes of practice, it is considered appropriate that all fire precautions are determined based on there being one seat of fire (i.e. accidental fires).
- 1.2.6 The strategy has been developed in cognisance of the Construction (Design and Management) Regulations 2015 (CDM 2015) [6], which sets out what designers are required to consider to protect anyone involved in the construction or ongoing use of a project.
- 1.2.7 This strategy does not provide a comprehensive assessment of site fire safety during the building works or the phasing of these works, though a designer's review of construction site fire safety issues is recommended to be conducted during technical design. The Fire Protection Association [7] and the Health and Safety Executive (HSE) [8] issue guidance on identifying and managing fire precautions during the works, which should be consulted by the contractor or their specialist advisor when developing their construction fire safety plan.

1.3 The London Plan (December 2019) - Policy D12

- 1.3.1 The draft Policy D12 states:

In the interest of fire safety and to ensure the safety of all building users, all developments proposals must achieve the highest standards of fire safety and ensure that they:

- *Identify suitably positioned unobstructed outside space:*
 - *For fire appliances to be positioned on;*
 - *Appropriate for use as an evacuation assembly point;*
- *Are designed to incorporate appropriate features which reduce the risk to life and the risk of serious injury in the event of a fire; including appropriate fire alarm systems and passive and active fire safety measures;*
- *Are constructed in an appropriate way to minimise the risk of fire spread;*
- *Provide suitable and convenient means of escape, and associated evacuation strategy for all building users;*
- *Develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in;*
- *Provide suitable access and equipment for firefighting which is appropriate for the size and use of the development.*

All major development proposals should be submitted with a Fire Statement, which is an independent fire strategy, produced by a third party, suitably qualified assessor. The statement should detail how the development proposal will function in terms of:

- *The building's construction: methods, products and materials used, including manufacturers' details;*
- *The means of escape for all building users: suitable designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach;*

- Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans;
- Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and position of equipment, firefighting lifts, stair and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these;
- How provision will be made with the curtilage of the site to enable fire appliances to gain access to the building;
- Ensuring that any potential future modification to the building will take into account and not compromise the base build fire safety/ protection measures.

- 1.3.2 This document has been prepared in line with the above items and is deemed suitable to be adopted as the Fire Statement that is referenced in Policy D12. However, as this document is intended to serve as strategic guidance, detailed design information such as the methods of construction or the selection of specific products will not be included within this document and can be obtained from other members of the design team.
- 1.3.3 In accordance with Policy D5 (Inclusive Design) of the London Plan, safe and dignified emergency evacuation is required to be incorporated into the building for all building users. As this building has a passenger lift installed, the aforementioned policy stipulates that the lift should be suitably sized for evacuation and should be provided in addition to any firefighting lift installed in a stair core.
- 1.3.4 Fire evacuation lifts and associated provisions should be appropriately designed and constructed and should include the necessary controls suitable for the purposes intended. Furthermore, the operation of the lifts should be supported by appropriate management procedures. In accordance with Annex G of BS 9999, the evacuation lifts may be operated using either driver assisted evacuation, automatic evacuation or remote assistance evacuation. The end client shall need to understand and provide a suitable management plan for the evacuation lifts within the building.
- 1.3.5 In accordance with Clause 3.12.9 of Policy D12 of the London Fire Plan, Fire Statements are to be produced by qualified engineers with relevant experience in fire safety such as a chartered engineer or suitably qualified and competent professionals with demonstrable experience to address the complexity of the design being proposed. The relevant experience of the authors and authorisers of this document are displayed in the table below.

Table 1 - Qualifications and relevant experience

Name	Role	Academic qualifications	Membership of professional bodies	Relevant experience
Daniel Mois	Fire Engineer	BSc Civil Engineering MSc Civil Engineering - Building Structures	Associate Member with the Institute of Fire Engineers (AIFireE) Member, Society of Fire Protection Engineers (MSFPE)	3 years in the design of fire strategies for residential buildings

Name	Role	Academic qualifications	Membership of professional bodies	Relevant experience
Felipe Herrera	Associate Director	BSc Architectural Engineering MSc Architectural Engineering	Chartered Engineer Member with the Institute of Fire Engineers (MIFireE) Member of the Society of Fire Protection Engineers (MSFPE)	10 years in the design of fire strategies for residential buildings 16 years total as an international engineer in the wider construction industry

- 1.3.6 As this document is a performance-based strategic document which is used to inform other members of the design team. As such, when reviewing the draft Policy D12 requirements, this document should be read in line with other supporting documentation produced by other members of the design team. The exact planning requirements are to be discussed with the planning authority.

1.4 Reference information

- 1.4.1 This strategy is based on information provided by Mutiny Architecture to Ashton Fire as listed in Table 2. Additional contradictory information or subsequent design variations to the information supplied may render the findings and recommendations of this report invalid.
- 1.4.2 External references utilised in the generation of this report are summarised in Section 9.

Table 2 - Project documentation referenced

Description	Reference	Date
Proposed Floor Plans 00	221-03-PRP-100-00	03-05-22
Proposed Floor Plans 01	221-03-PRP-101-00	03.05.22
Proposed Section AA & BB	221-03-PRP-200-00	03.05.22

2. PROJECT OVERVIEW

2.1.1 The project is for the refurbishment and extension of an existing residential building located on Mansfield Heights, Great North Road, London. The building can be accessed via an internal road off Great North Road. The site plan is illustrated in Figure 7.

2.2 Existing building

- 2.2.1 The existing building is a residential apartment building with 6 storeys (G + 5). Each level is provided with two flats which are served by two independent stairs and a lift. One main internal stair, and an additional external stair.
- 2.2.2 The precise footprint area is unknown but has been determined as being approximately 200m².
- 2.2.3 The building height, from access level to the highest finished floor level, is approximately 15m.
- 2.2.4 The internal layouts to the flats are open in nature, and both flats (per level) have access to stair. A typical floor plan can be seen in Figure 7. An elevation view of the existing building can be found in Figure 2.

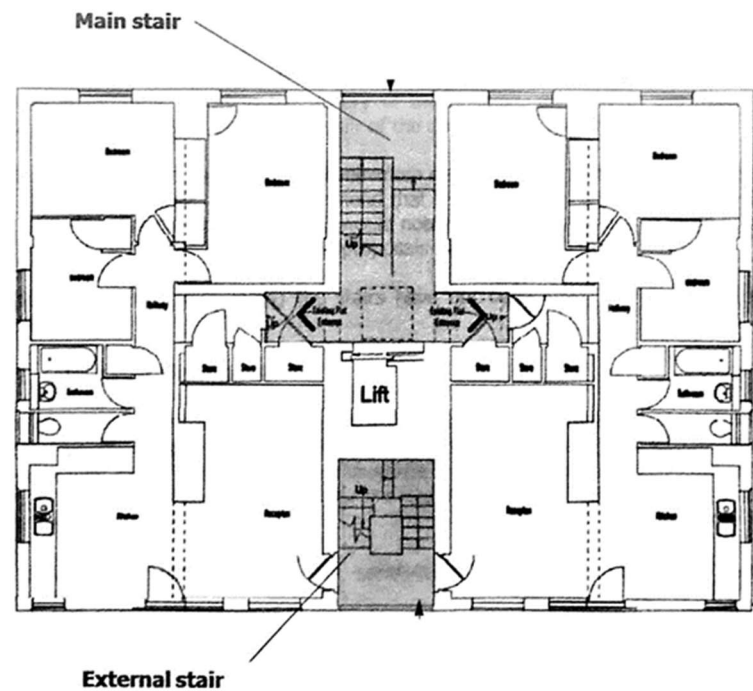


Figure 2: Plan of a typical floor

Figure 1- Indicative site plan layout

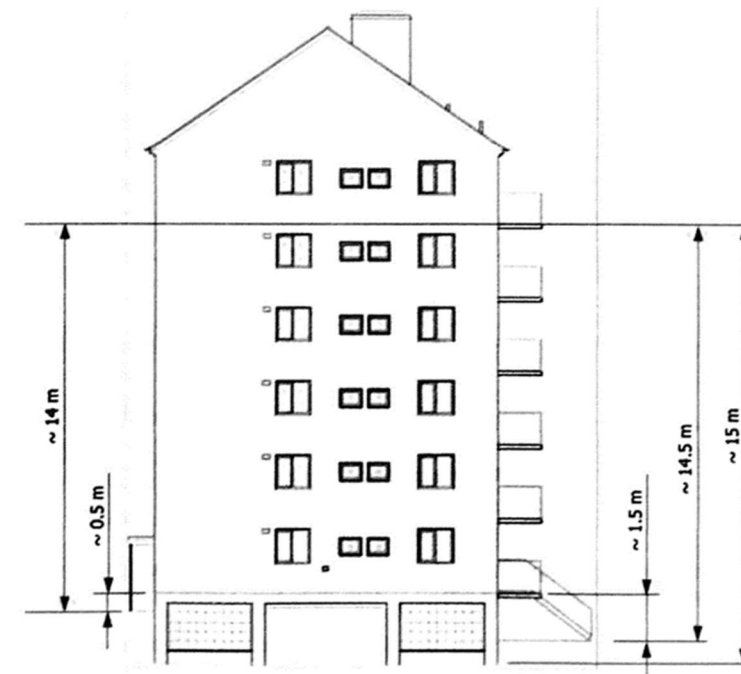


Figure 1: West side elevation showing the heights of the building; the front is on the left-hand side of the drawing, the rear at the right-hand side

Figure 2 - Indicative site N-W Elevation

- 2.2.5 To understand the fire safety level of the existing building, a summary table is provided to list the main fire safety provisions. These provisions are only indicative and to compare with the improvements that are proposed for the new design; a comprehensive survey has not been carried out.

Table 3 - Existing building main fire safety provisions

Design item	Presence
Stair width	Unknown
Stair ventilation	Unknown
Stair protection	Stair is merged with common corridor (Flats open directly into stair)
Common corridor ventilation	No ventilation
Suppression protection	Not provided
Secondary stair	Needed to comply with travel distances (to be confirmed)
Lift protection	Unknown
Stair discharge	Open into common corridor
Fire mains	Unknown
Fire detection system	Assumed present

2.3 Proposed new building

- 2.3.1 The proposed new building is to maintain its footprint and number of flats per level; however, 1 new floor (6th floor) is planned on top of the existing floors.
- 2.3.2 The height would increase by about 3m resulting in a finished floor level of the top-most floor as being approximately 17.5m i.e. below 18m. It is important to know that the new 6th floor will be occupied with two additional flats with galleries. The flats are accessed only from the 6th floor and the galleries would be located 20.05m above access level.
- 2.3.3 The galleries occupy an area of less than 50% of the 6th floor flat areas below.
- 2.3.4 Figure 5 below shows a floor plan of the proposed new 6th level. Figure 3 below shows the existing ground floor with the proposed new flat layouts, and Figure 4 shows a typical existing floor plan with the proposed new typical flat layouts.

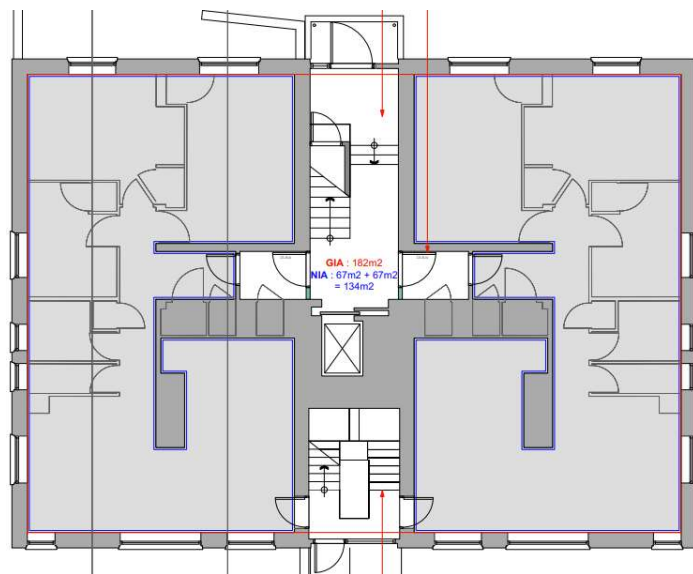


Figure 3- Ground floor plan

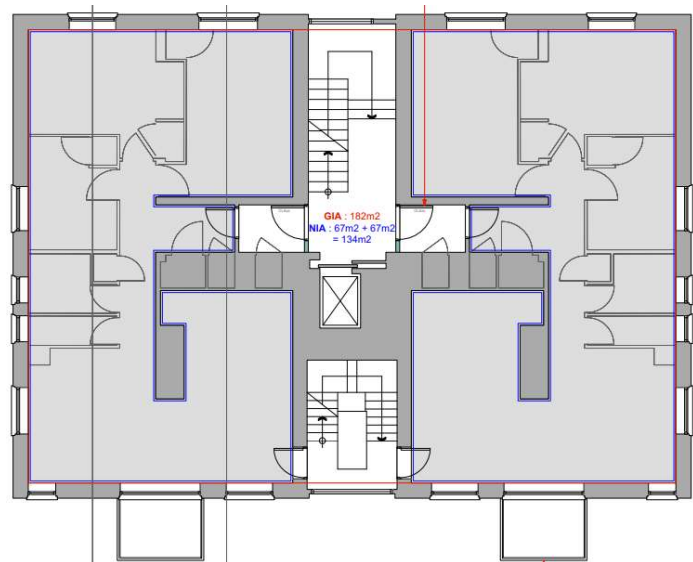


Figure 4- Typical 1st to 5th floor plan

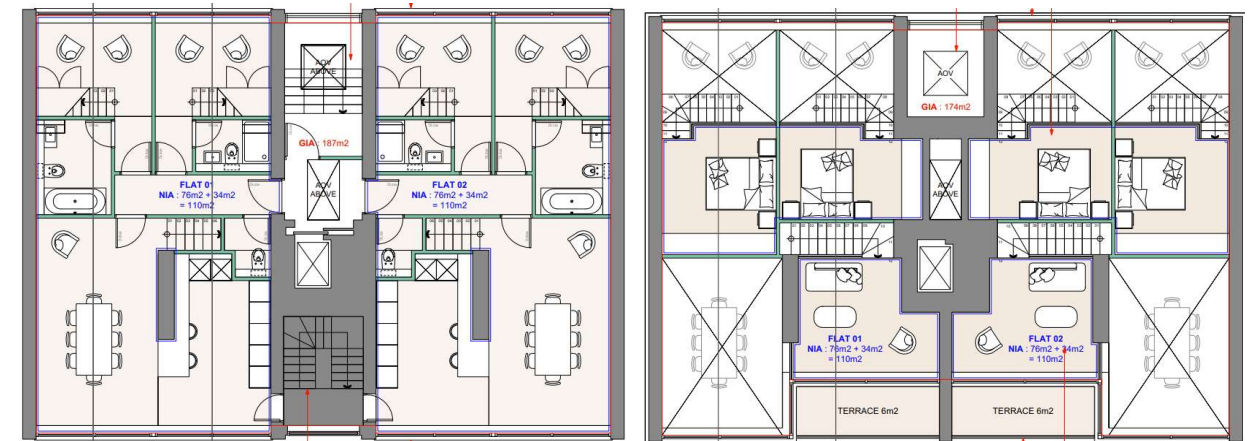


Figure 5- New floor plan (Entry 6th floor level at the left and gallery level at the right).

2.4 Storeys and heights summary

- 2.4.1 Table 4 below shows a summary of the number of storeys and heights for the existing and the proposed building. Figure 6 below shows a preliminary section view of the proposed building.

Table 4 - Existing and proposed building heights

Building	Number of storeys	Height
Existing	6 (G + 5)	15m
Proposed	7 (G + 6)	17.5m (Galleries at 20.05m)

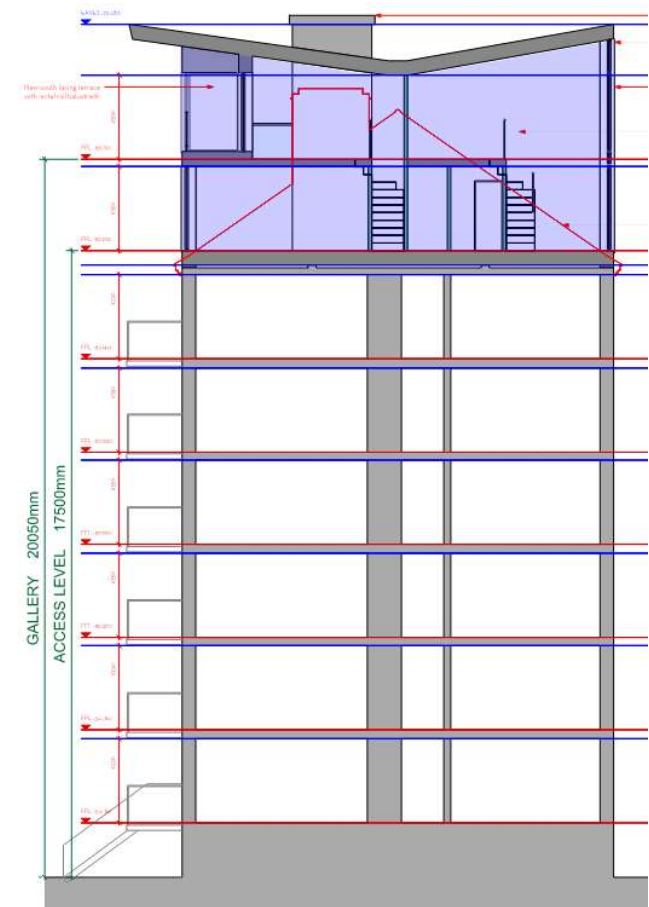


Figure 6 - Preliminary section view with new floor shaded in blue

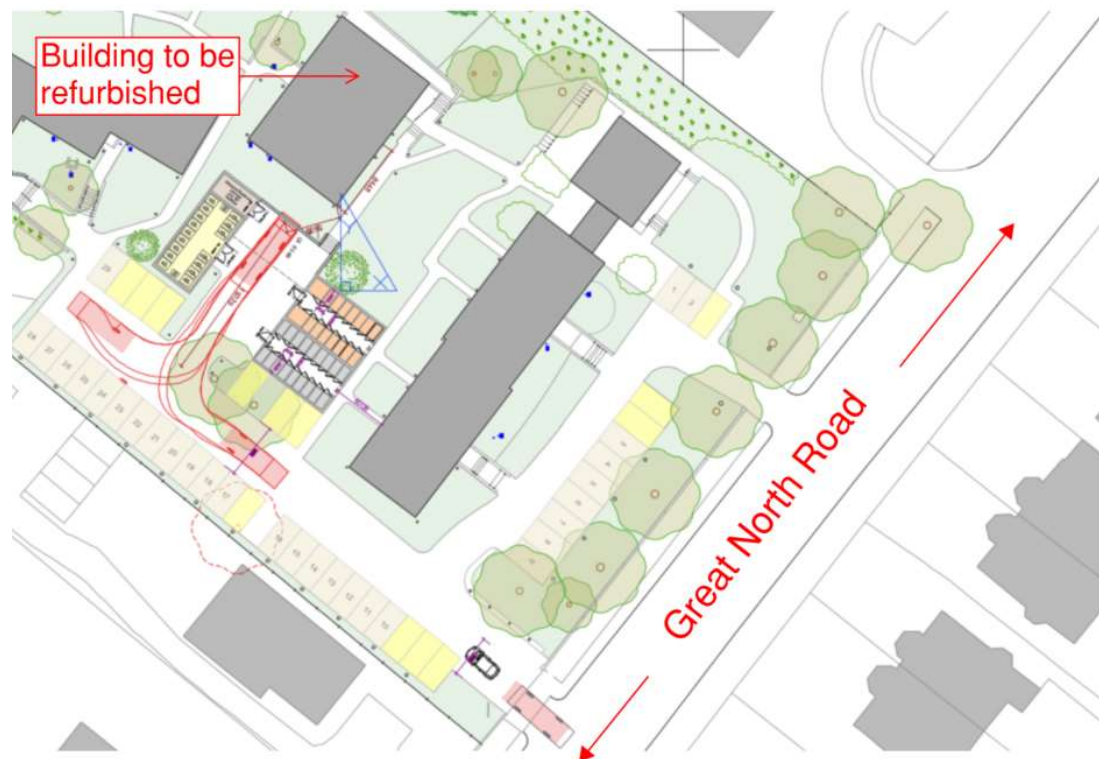


Figure 7 - Indicative site plan layout

3. ACTIVE FIRE SAFETY SYSTEMS

3.1 Means of detection and alarm

3.1.1 The fire detection and alarm system recommendations across the building are summarised in Table 5.

Table 5 – Minimum recommended fire detection and alarm system

Accommodation	Minimum recommendations
Residential units	Category LD1 to BS 5839-6 [9] where fire-resisting construction to entrance hall is omitted. This system will raise an alarm within the unit of fire origin and at the fire alarm panel.
Residential communal corridors	L5 system conform to BS 5839-1 [10]. The system will activate the smoke ventilation system within the common corridor of the new 6 th floor and the escape stair. It will not provide an audible alarm within the building but at the fire alarm panel.
Ancillary (Roof plant)	L1 system conforming to BS 5839-1. The ownership, management and maintenance of the system is to be discussed and agreed with the client.

3.2 Automatic suppression system

- 3.2.1 In accordance with BS 9991 guidance, the building is required to be provided with an automatic suppression system.
- 3.2.2 Notwithstanding the above, in cognisance of the latest amendments of Approved Document B Vol 1 (May 2020 amendments), the proposed building will have a top occupied floor at more than 11m above ground level and, as such, it shall be provided with a Category 2 sprinkler system conforming to BS 9251 [11] throughout.
- 3.2.3 Ancillary small areas should be provided with a sprinkler system in accordance with BS EN 12845 [12]. However, 'Note 2' within section 4.1 of BS 9251 does not preclude the use of a residential type sprinkler system within non-residential areas subject to full evaluation, consultation and agreement. It is therefore considered reasonable to extend the coverage of the residential sprinkler system to the roof plant only if the roof plant areas are covered. This will require early consultation with the authorities.
- 3.2.4 The design of the sprinkler system shall be carried out by a sprinkler specialist.

3.3 Residential smoke ventilation system

- 3.3.1 In accordance with BS 9991 guidance, a smoke ventilation system shall be provided within the portions of the common corridors serving the escape stairs and at the head of the stairway.
- 3.3.2 As discussed below, the above recommended smoke ventilation will be installed for the new floor only. Space constraints do not allow for mechanical nor natural smoke ventilation ducts/shafts to be installed on the new lobbies of the existing floors.
- 3.3.3 All automatically opening vents should conform to BS EN 12101-2 [13].
- Smoke ventilation**
- 3.3.4 A natural smoke ventilation system shall be installed to protect the escape routes from both flats on the new 6th floor. The system shall be tailored specifically for the common corridor serving both flats on the 6th floor; i.e. a system that serves the common corridor in front of the main internal stair.

- 3.3.5 One extraction point is required for the corridor, which will be balanced out with an inlet via a 1.5m² automatic openable vent (AOV) at the head of the stair. This extraction point will be located at ceiling level and will also have a free area of 1.5m².

3.4 Electromagnetic locking / hold-open devices

- 3.4.1 Where doors are provided with electromagnetic locking or hold-open devices, these devices are to operate (either release the door to close normally, or release the door to be opened) upon:
- Activation of the detection and alarm system;
 - Failure of the power supply;
 - Operation of a hand operated witch located to the side of the door;
 - Malfunction.

3.5 Emergency lighting

- 3.5.1 Emergency lighting will be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. As part of the emergency lighting system, escape lighting will be provided to ensure the escape routes are illuminated at all material times. Adequate artificial lighting will be provided in all common escape routes and will be of a sufficient standard to enable persons to see to escape.
- 3.5.2 Emergency lighting will be installed in accordance with the recommendations of BS 5266 [14], BS EN 1838 [15] and BS EN 60598-2-22 [16].
- 3.5.3 Emergency lighting will illuminate all occupied areas, common evacuation routes (internal and external as necessary) and essential areas including plant areas. It will also illuminate a safe exit route including fire exits, fire alarm call points, changes in level or direction and fire-fighting equipment. Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.

3.6 Fire safety signage

- 3.6.1 Fire safety signs will be installed where necessary to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All parts of the development will be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996, i.e. signage to be specified in according to BS ISO 3864-1 [17], BS 5499-4 [18] and BS 5499-10 [19].
- 3.6.2 The purpose of fire signs is to direct persons towards fire exits, or to provide specific information or warning about particular equipment, doors, rooms or procedures. They should be recognisable, readable and informative, as they convey essential information to regular and infrequent users of the premises, and the fire and rescue service.
- 3.6.3 Following latest amendments of ADB Vol 1 (May 2020), each residential core / stair shall be provided with floor identification signs and flat indicator signs located on every landing of a protected stairway and every protected corridor/ lobby.
- 3.6.4 The text should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch. The wording used on each floor identification sign should take the form of 'Floor X', with X designating the floor number. Additionally, each floor identification sign shall be provided with information relating to the flats accessed on each storey.

3.7 Emergency (life-safety) power supplies

3.7.1 All life-safety systems shall be provided with robust power supplies in accordance with Figure 1 of BS 8519 [20].

3.7.2 The following fire safety systems shall comply with their respective British Standards regarding secondary power supplies:

- Emergency lighting and signage;
- Automatic fire detection and alarm system;
- Automatic smoke ventilation systems;
- Firefighting and evacuation lifts;
- Automatic suppression systems;
- Emergency voice communications systems.

There must be a minimal delay in change over if the main power fails and it must occur automatically.

3.8 Evacuation lifts

3.8.1 In accordance with the London D12 Policy recommendations, consideration should be given on how all building occupants, including those with reduced mobility / wheelchair users can evacuate in an emergency. As it can be difficult for people with reduced mobility (PRM) to navigate the escape stairs, it is typically recommended that occupants are provided with use of suitable lifts in an emergency.

3.8.2 Where evacuation lifts are to be provided, the evacuation lift should be a lift routinely used as a passenger lift. The lift should be designed and installed in accordance with relevant provisions of BS EN 81-20 [21] and BS EN 81-70 [22].

3.8.3 The evacuation lift would be required to be provided with a secondary power supply.

3.8.4 The cause and effect of any evacuation lift is to be discussed and agreed.

4. MEANS OF WARNING AND ESCAPE

Building Regulations requirement B1:

"The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times."

4.1 Evacuation philosophy

Residential

- 4.1.1 A 'stay-put' (also known as 'defend-in-place') strategy will be implemented in all flats. No other flat will receive an alert notification, though should residents become aware of a fire in another flat they may leave the building if they wish to do so.
- 4.1.2 In the event of a fire that spreads beyond the unit of fire origin, the wider evacuation of the building would be managed by the fire service.

Non-residential

- 4.1.3 The non-residential plant areas on the roof shall operate on a local simultaneous evacuation philosophy. These areas shall operate independently from the rest of the building i.e. activation of the detection and alarm system within these areas will not raise an alarm within the residential units.
- 4.1.4 Similarly, a fire originated in the residential areas would not raise an alarm within the roof space.
- 4.1.5 The fire detection and alarm systems shall be configured to support this strategy.

4.2 Horizontal means of escape

- 4.2.1 All flats will be provided with an automatic fire suppression system and an LD1 fire detection and alarm system. As such, where the distance to a flat entry door is not more than 20m from the furthest point in an apartment, the 30-minute fire protection to the entrance halls may be omitted in accordance with section 9.4.2 of BS 9991.
- 4.2.2 Any cooking equipment in the flat should be located away from escape routes so as to not prejudice the escape from the balconies or other rooms.
- 4.2.3 From each upper level, occupants will be able to escape via a common protected corridor/lobby that leads into the main protected stair.
- 4.2.4 For the existing floors, the corridors will require a smoke sealed fire rated door. This is an enhancement to the current conditions as the existing building has flats that open directly into the stair. See Figure 8 below.
- 4.2.5 On the new 6th floor, the protected corridor will also be ventilated, as detailed in Section 3.3 above.
- 4.2.6 On ground level, flat occupants will need to escape via a common corridor/lobby that leads towards the stair and then directly to outside.

4.3 Horizontal means of escape - Common areas

Existing floors - Ground to 5th

- 4.3.1 On each existing floor, flats will have a single escape route via a protected common corridor/lobby that leads to the single protected stair. Two common corridors/lobbies are available per floor, one for each flat.

- 4.3.2 The common corridors/lobbies will not be smoke vented because of the lack of space on the existing flats to install a vertical smoke shaft or horizontal smoke ducts directly to outside on each level. This arrangement is still considered an enhancement to the existing building condition, which has flats opening directly into the internal stair.
- 4.3.3 The maximum single travel distances in the corridor are within the recommended limit of 7.5 m. 7.5m is the travel distance limit in buildings where sprinkler protection is provided, and travel is via a protected corridor.
- 4.3.4 In addition to the escape route via the main stair, occupants on each existing flat will have access to the secondary external stair in case the main internal stair is blocked. Access to the external stair will be done via ne FD60S fire rated doors to prevent smoke from entering this secondary escape route.
- 4.3.5 For this existing arrangement, the staircase will be merged with the lift on every existing floor. This is not a typical arrangement for buildings suited with a firefighting shaft; however, the existing building, existing stair core and available common areas are limited and separation between the stair and the common areas is not possible due to obstructions with the stair flights. This is discussed in detail in Sections 8.3.10 to 8.3.15.
- 4.3.6 BS 9991 recommends that ancillary accommodation does not connect to the only part of an escape route from a flat. Currently, no ancillary rooms are planned to be located on any of the common corridors/lobbies.
- 4.3.7 The typical means of escape principles for the existing floors is shown in Figure 8.

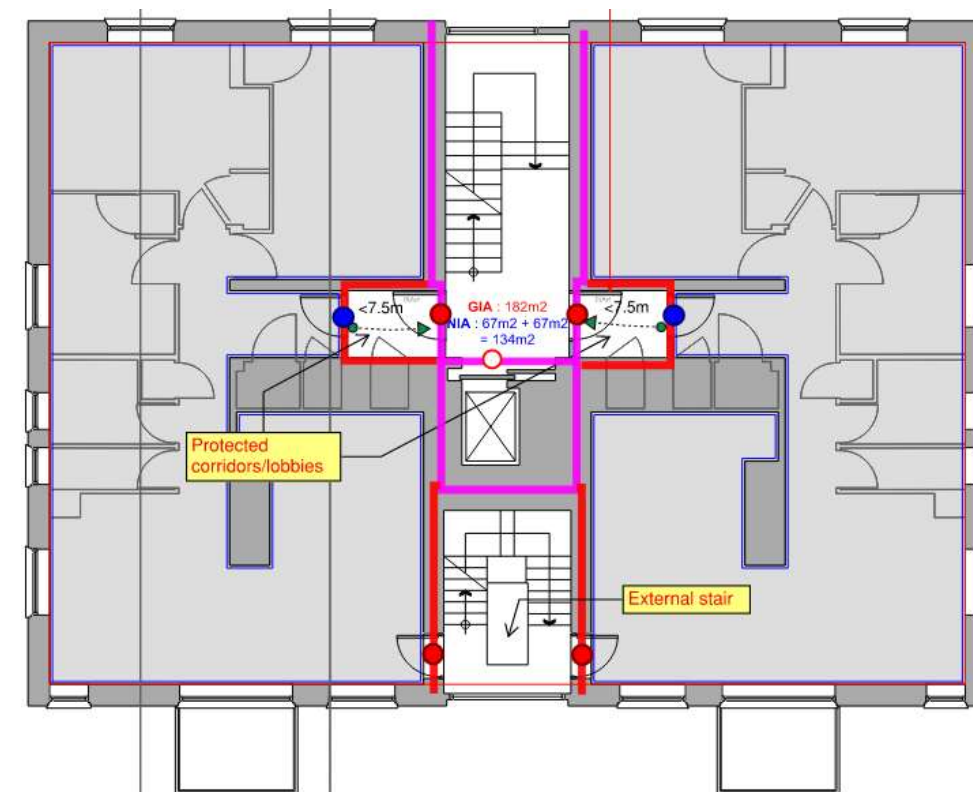


Figure 8 - Means of escape - Typical existing floor

4.3.8 In Figure 8 above, the magenta lines represent 120-minute fire rated walls, the red lines 60-minute fire rated walls, the red dots 60-minute fire rated doors and the blue dots 30-minute fire rated doors. See Table 7 for further details on compartmentation.

New 6th floor

- 4.3.9 On the new 6th floor, flats will have a single escape route via a protected common corridor/lobby that leads to the single protected stair. One common corridor is available serving both flats.
- 4.3.10 The common corridor will be smoke vented in accordance with Section 3.3, with the maximum single travel distances in the corridor being within the recommended limit of 15 m. 15m is the travel distance limit in buildings where sprinkler protection is provided, and travel is in a ventilated portion of the corridor.
- 4.3.11 BS 9991 recommends that ancillary accommodation does not connect to the only part of an escape route from a flat. Currently, no ancillary rooms are planned to be located on any of the common corridors/lobbies.
- 4.3.12 The typical means of escape principles for the upper floors is shown in Figure 9.

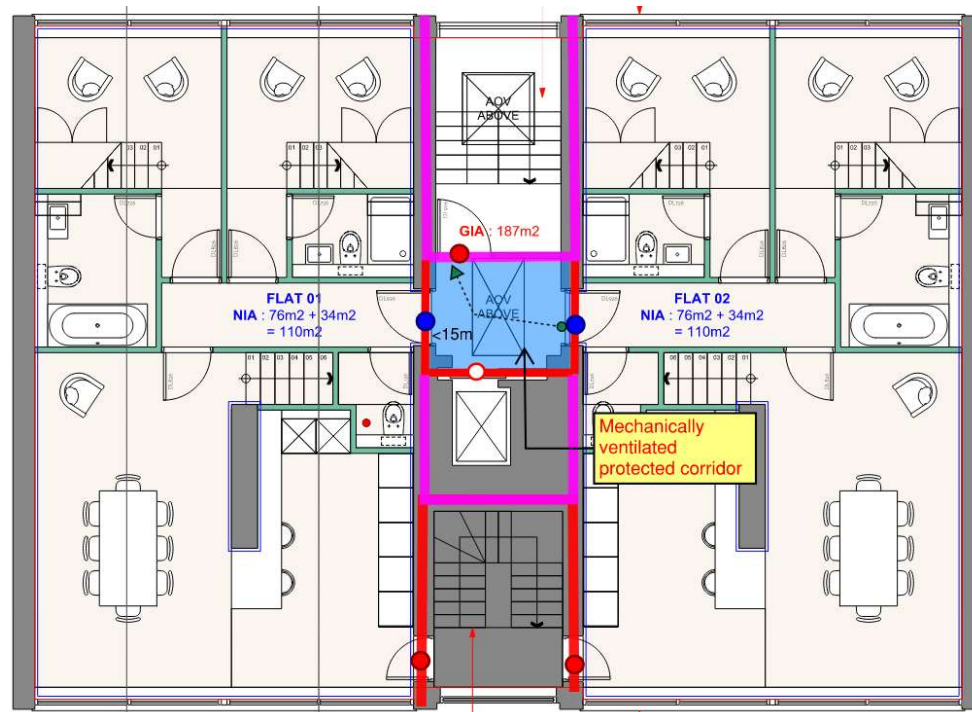


Figure 9 - Means of escape - New 6th floor

4.3.13 In Figure 9 above, the magenta lines represent 120-minute fire rated walls, the red lines 60-minute fire rated walls, the red dots 60-minute fire rated doors and the blue dots 30-minute fire rated doors. See Table 7 for further details on compartmentation.

4.3.14 Escape from the galleries is done via the internal stairs down into the entry level below and then into the main internal stair. The galleries have an area of less than 50% of the flat areas below.

Roofs

4.3.15 The current design considers general access to the building roof. The roofs will be accessible for maintenance only and as such, an escape hatch or a fire rated door shall be provided for staff to be able to escape via the protected stair. Single direction travel distances on the roof shall be less than 60m considering a single direction escape route.

4.3.16 Access from the roof into the protected stair will be via a route fully open to outside. As such, and because the roof will not contain any type of combustibles, ventilated protected lobbies are not required for the stair on roof level.

Ground floor and stair discharge routes

4.3.17 The final exit from all stairs will be at ground level. Occupants will be able to escape via the common corridors/lobbies and then via the protected stair, as mentioned in 4.3.5.

4.4 Private balconies

4.4.1 Private balconies shall meet the following recommendations:

- The escape routes from the balcony should not pass through more than one access room;
- A detection and alarm system in accordance with BS 5839-6 shall be provided to the access room with an alarm system on the balcony where escape via the access room is unsighted;
- The maximum permitted travel distance from the balcony access door to the furthest point on the balcony is 7.5m.

4.4.2 Balconies and terraces shall be designed in accordance with BS 8579:2020. It should be noted that components of balconies in building over 11m and stacked balconies within all buildings regardless of height, should be constructed from materials achieving class A1 or A2-s1, d0 in accordance with BS EN 13051-1:2018 [23].

4.5 Means of escape from non-residential areas

4.5.1 Where a single exit is available, the number of occupants within these areas shall not exceed 60 persons at any time.

4.5.2 The maximum permitted travel distance within the ancillary rooms is limited to 9m. However, the maximum travel distance to the nearest storey exit is 18m. When the escape route is via open air, the single direction limit is 20m and the multi-direction limit is 60m.

4.5.3 Irrespective of the required design width of exits, they shall have a clear width of minimum:

- Doors - 800mm or 850mm where unassisted wheelchair users are expected;
- Stair - 1,100 mm for downward travel (see Clause 4.6).

4.5.4 Doors hung to swing against the direction of escaping occupants are to serve a maximum of 60 people, irrespective of the available clear exit width.

4.5.5 Doors opening onto stairways or corridors will be sited not to encroach on the effective width of any stairway, landing or corridor.

4.5.6 The minimum clear width should be measured in accordance with Figure 10.

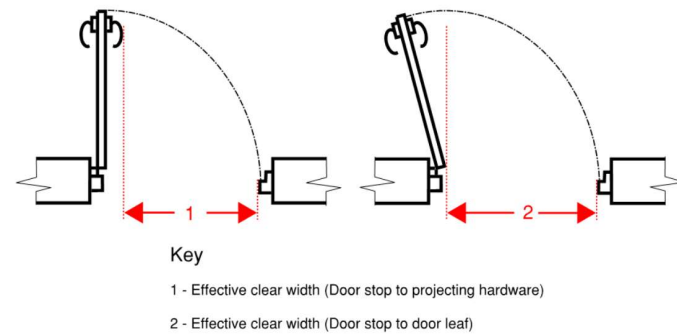


Figure 10 - Measurement of clear width

4.6 Vertical means of escape

- 4.6.1 It should be noted that other standards, such as Approved Document M [24] and K [25], may have more onerous requirements than those stated above.
- 4.6.2 The stair width should have a clear head height of at least 2m.
- 4.6.3 The escape stair and internal protected escape routes are required to be kept fire sterile.
- 4.6.4 The flights and landing of the stair should be constructed of materials achieving Class A2-s3, d2 or better.
- 4.6.5 Where the handrails intrude 100mm or less, these can be ignored when assessing the clear width of the escape stairs.
- 4.6.6 The final exits and door widths shall be at least as wide as the stair.

4.7 Final exits and onward escape

- 4.7.1 Travel beyond the final exits away from the building and toward a place of ultimate safety should not be jeopardised by unprotected openings. This is generally achieved by the provision of exit paths that lead away from the building from each of the final exits, or alternate paths along the building façade.
- 4.7.2 In general, the building is provided with escape routes, upon exiting the building, that are directly away from the building.
- 4.7.3 The selection of a suitable assembly point is an operator-led exercise. Assembly areas are not required to be designated for residential buildings.

4.8 Means of escape for disabled persons

- 4.8.1 Building management will develop procedures to assist with the evacuation of disabled persons in the event of fire. It will not rely on the fire and rescue service for assistance.
- 4.8.2 Under the Regulatory Reform (Fire Safety) Order 2005, it is the duty of the responsible person to ensure that there are measures and procedures in place to allow everyone to be assisted to a place of ultimate safety outside the building in the event of an emergency.

Evacuation of occupants that require assistance

- 4.8.3 In accordance with London Plan – Policy D12 and Section 54 of BS 9991, suitable and convenient means of escape should be provided for all building users.
- 4.8.4 To support this, Policy D12 stipulates evacuation lifts are to be provided. The planning requirements have been discussed with the planning consultants and the relevant stakeholders and it has been agreed that evacuation lifts will not be installed due to limitations on the building existing fabric.

- 4.8.5 For this reason Policy D12 intentions will not be met with regard to installation of an evacuation lift. However, as discussed in the Executive summary, it is understood that the adopted London Plan (2021) and Policy D12 is not applicable to this existing building.”.
- 4.8.6 Where provided, evacuation lifts should be in accordance with the details described in Section 3.8 of this report.
- 4.8.7 Premises management should assess the needs of all people to make a safe evacuation. Evacuation plans should be developed taking this into account and should not rely on the assistance of the fire and rescue service.
- 4.8.8 Where ramps are located on escape routes, these should have an incline of no more than 1:12.

5. INTERNAL FIRE SPREAD – LININGS

Building Regulations requirement B2:

- “(1) To inhibit the spread of fire within the building, the internal lining shall:
- a) Adequately resist the spread of flame over their surfaces; and
 - b) Have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.
- (2) In this paragraph ‘internal linings’ mean the materials or products used in lining any partition, wall, ceiling or other internal structure.”

5.1 Internal wall and ceiling linings

- 5.1.1 During the development of a fire in a building, the choice of material for the lining of walls and ceilings can significantly affect the spread of fire and its rate of growth.
- 5.1.2 Restrictions are placed on the wall and ceiling lining materials within certain areas of buildings to limit the spread of fire and production of smoke in these areas.
- 5.1.3 It is particularly important that in circulation spaces, where the rapid spread of fire is most likely to prevent occupants from escaping, the surface linings are restricted, by making provision for them to have low rates of heat release and surface spread of flame.
- 5.1.4 All wall and ceiling linings within the building should meet the recommendations of Section 20 of BS 9991 when tested under either the National Classification (in accordance with BS 476-7 [26]) or under the European Classification (in accordance with BS EN 13501-1 [27]) as summarized in Table 6.
- 5.1.5 The surface linings of walls and ceilings should generally conform to the classification recommended above for the appropriate location. However, parts of walls in rooms may be of a lower class but not lower than European Class D-s3, d2, provided that the floor area of those parts in any one room does not exceed half of the floor area of the room, subject to a maximum area of 60 m² in non-residential areas and 20m² in residential areas.

Table 6 – Surface spread of flame requirements

Location	National Class	Euro Class
Small rooms ≤ 4m ² (residential and ancillary)	Class 3	D-s3, d2
Small rooms ≤ 30m ² (non-residential areas)	Class 3	D-s3, d2
Circulation spaces (communal)	Class 0	B-s3, d2
Circulation spaces (within dwellings)	Class 1	C-s3, d2
Other rooms	Class 1	C-s3, d2

5.2 Roof lights and thermoplastic materials

- 5.2.1 Any non-plastic rooflights are to meet the recommendations of Table 4.
- 5.2.2 Where thermoplastic materials are used in the building, these are to comply with the various recommendations provided in Sections 18.6 in BS 9991.

6. INTERNAL FIRE SPREAD – STRUCTURE

Building Regulations requirement B3:

- “(1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.
- (2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings. For the purposes of this sub paragraph a house in a terrace and a semi-detached house are each to be treated as a separate building.
- (3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following:
- (a) sub-division of the building with fire resisting construction;
 - (b) installation of suitable automatic fire suppression systems.
- (4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.”

6.1 Structural fire resistance

- 6.1.1 The required period of fire resistance of the structural elements has been based upon the recommendations in Table 3 and Table 4 of BS 9991.
- 6.1.2 The building has a top storey height below 18m. As such, the structural elements should achieve a minimum rating of 60 minutes fire resistance.
- 6.1.3 Where an element of structure supports or provides stability to another element of structure, then the protection to the supporting structure should be at least the same as the structure it is supporting.
- 6.1.4 Elements of structure that only support a roof do not generally require fire resistance. Structure is considered to support more than only a roof if it supports a load other than the roof itself (e.g. rooftop plant) or is essential to the stability of a compartment or other fire resisting wall (internal or external).

6.2 Compartmentation and fire-resisting construction

- 6.2.1 Each storey floor shall be designed as a compartment floor. The compartment floors for the building and the basement shall achieve a fire resistance of 60 minutes.
- 6.2.2 All shafts (e.g. risers, lift shafts and stair cores) are to be constructed as protected shafts where these penetrate compartment floors.
- 6.2.3 All flats will be separated from each other and from common areas by construction having a fire-resistance rating of at least 60 minutes, with FD30S doors.
- 6.2.4 Fire-resisting construction will be provided in accordance with the recommendations of BS 9991 and BS 9999, as summarised in Table 7. Fire doors should be provided as summarised in Table 9 in accordance with the recommendations of BS 9991 and BS 9999.
- 6.2.5 Even though the 6th floor is located below 18m, the main internal escape and firefighting access stair will be provided with fire separation lines as per a typical firefighting shaft. This is to account for the lack of ventilation for the common corridors on the existing floors and to the fact that the building is close to the 18m height limit.

Table 7 – Fire compartmentation requirements

Part of Building	Minimum Fire Resistance rating when tested to the relevant part of BS 476 (mins)	Methods of Exposure
Structural elements	60 R	Exposed Faces
Compartment floor	60 REI	From underside
Compartment wall – party wall	60 REI	Each side separately
Compartment walls between flats and the rest of the building / other flats	60 REI	Each side separately
Compartment walls separating different occupancies	60 REI	Each side separately
External walls:		
Any part less than 1,000 mm from a point in the relevant boundary	60 REI	Each side separately
Any part more than 1,000 mm from the relevant boundary	60 RE 15I	From the inside
Any part adjacent to an external escape route or stair	30 RE	From the inside
Protected shafts (risers, lifts, smoke shaft)	60 REI	Each side separately
Protected stairs	60 REI	Each side separately
Protected enclosure not forming part of a compartment wall or shaft to a lobby or corridor	30 REI	Each side separately
Mechanical smoke vent routes/ducts for the new floor	To be defined in next design stage	Each side separately
Enclosing ancillary accommodation	(See Table 8) REI	Each side separately

6.3 Ancillary accommodation

- 6.3.1 Any ancillary accommodation to be located on the roof is to be enclosed within fire-resisting construction in accordance with Table 15 of BS 9991. The degree of separation required depends on the contents of the room / enclosure and is summarised in Table 8.

Table 8 - Ancillary accommodation fire protection requirements

Ancillary accommodation	Minimum fire resistance
Storage areas not greater than 450m ²	30 minutes
Transformer, switchgear and battery rooms for LV equipment	

Ancillary accommodation	Minimum fire resistance
Dressing or changing rooms	60 minutes
Kitchen	
Storage areas greater than 450m ²	
Service installation rooms	
Places classified as high fire risk areas	
Repair and maintenance workshops where flammable liquids are used / stored	90 minutes
Transformer and switchgear rooms for equipment above low voltage	
Refuse storage areas	
Boiler rooms	
Fuel storage spaces	
Rooms housing fixed internal combustion engine (s)	120 minutes (note: the electricity distribution network operator may have high fire-resistance requirements for the substation))
Any area that contains plant associated with life safety systems and fire protection systems Substation	

- On operation of the detection and alarm system.
- On loss of power or system.
- On activation of a manual door release unit (Type A) that is designed to BS EN 54-11 [28] and is positioned at side of the door that is approached by people making their escape. Where the door provides escape in either direction, a unit should be installed on both sides of the door.

Table 9 – Fire Doors

Position of Door	Tested to BS 476-22 [29]	Tested to BS EN1634-2 [30]
Enclosing ancillary accommodation	As per the wall it is fitted in	As per the wall it is fitted in
Compartment wall	As per the wall it is fitted in	As per the wall it is fitted in
Enclosing a protected stair shaft	FD 60 S	E 60 Sa
Enclosing a protected lobby / corridor	FD 30 S	E 30 Sa
Between a firefighting shaft and the rest of the building	FD 60 S	E 60 Sa
Fire-fighting lift shaft	FD 60	E 60
Enclosing a protected riser shaft except a smoke shaft	FD 60 S	E 60 Sa
Enclosing a smoke vent	The same as the fire rating of the duct/shaft and provided with smoke seals	
Notes: The ratings shown above are for integrity only. Smoke seals are indicated by the suffix 'S' (to BS 476-31 [31]) or Sa (to BS EN 1634-3 [32]) and are required in all doors including riser shafts (except for lifts) which form the enclosure to protected escape routes. All fire doors should be self-closing except for doors which are normally locked shut, such as to places of special fire hazard or service risers, which should also be provided with appropriate signage.		

6.4 Fire doors

- 6.4.1 Fire doors should be provided as summarised in Table 9.
- 6.4.2 Doors on escape routes should not be fitted with locks, latch or bolt fastenings or should only be fitted with simple fastenings that can be readily operated (without the use of a key) from the side approached by occupants making an escape.
- 6.4.3 Doors should generally be hung to open in the direction of escape and should always do so where it is expected that the number of persons expected to use the door at the time of a fire is more than 60. In corridors having escape in each direction, doors are recommended to swing in both directions.
- 6.4.4 Vision panels should be provided where doors on escape routes sub-divide corridors, or where doors are hung to open in both directions.
- 6.4.5 Any fire doors fitted with hold-open devices should release on:
- actuation of the fire alarm system;
 - manual operation or operation of a manual switch fitted in a suitable position, if necessary; or
 - failure of the electricity supplies.
- 6.4.6 Where doors on escape routes need to be secured against unauthorised use by electrically powered access control measures when the building or part of the building is occupied, it should also be overridden from the side approached by occupants making an escape. Electrically powered doors should return to the unlocked position;

6.5 Fire-stopping and penetrations through fire-resisting construction

- 6.5.1 Fire-stopping should be provided at the junction of fire-separating walls and external walls in order to maintain the fire resistance period of fire-separating walls, and thereby prevent a fire from travelling around the junction and into the neighbouring space.
- 6.5.2 Penetrations through lines of fire-resisting separation should be fire-stopped to achieve the same fire resistance as the separation.
- 6.5.3 All pipes, ductwork and services passing through fire-resisting separations should be either enclosed in fire-resisting construction (i.e. shafts) of matching fire resistance or provided with fire dampers of matching fire resistance. Certain small-diameter pipes require only fire-stopping around the pipe, dependent on pipe material and the type of fire-resisting barrier penetrated. Figure 12 is provided to assist in the interpretation of Section 19 of BS 9991.
- 6.5.4 Where ducts pass through fire-resisting construction of protected escape routes, dampers on fusible links are not sufficient. Either combined fire-and-smoke dampers activated upon smoke detection (ES-

type dampers) are provided, or the duct should be fire-resisting / enclosed within fire-resisting construction.

6.6 Cavity barriers and concealed spaces

- 6.6.1 Cavity barriers are provided to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids. Extensive internal concealed cavities (e.g. roof voids or the void between suspended ceilings and the soffit of the floor above) generally require cavity barriers to sub-divide them, as illustrated in Figure 11.
- 6.6.2 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). They should be located as follows:
- In general, cavity barriers should be at 20 m centres in cavities with exclusively Class C-s3, d2 linings or better. For other linings, the spacing between cavity barriers should be reduced to 10 m.
 - in voids below or above large rooms (e.g. the common rooms or employments spaces where these form single undivided spaces), cavity barriers may be at up to 40 m centres in either direction, provided there are also cavity barriers provided along the lines of the enclosing walls / partitions of that room and the cavity linings are exclusively Class 0 or 1; and
 - above walls enclosing protected escape routes, where the wall does not continue to the level of the soffit or roof above; and
 - above walls separating bedrooms, unless the ceiling is fire-resisting (30 minutes) and any penetrations through the ceiling are appropriately fire-stopped.
- 6.6.3 Cavity barriers provided around openings within the external wall may be formed of:
- steel at least 0.5mm thick or timber at least 38mm thick; or
 - polythene-sleeved mineral wool, or mineral wool slab under compression when installed cavity; or
 - calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

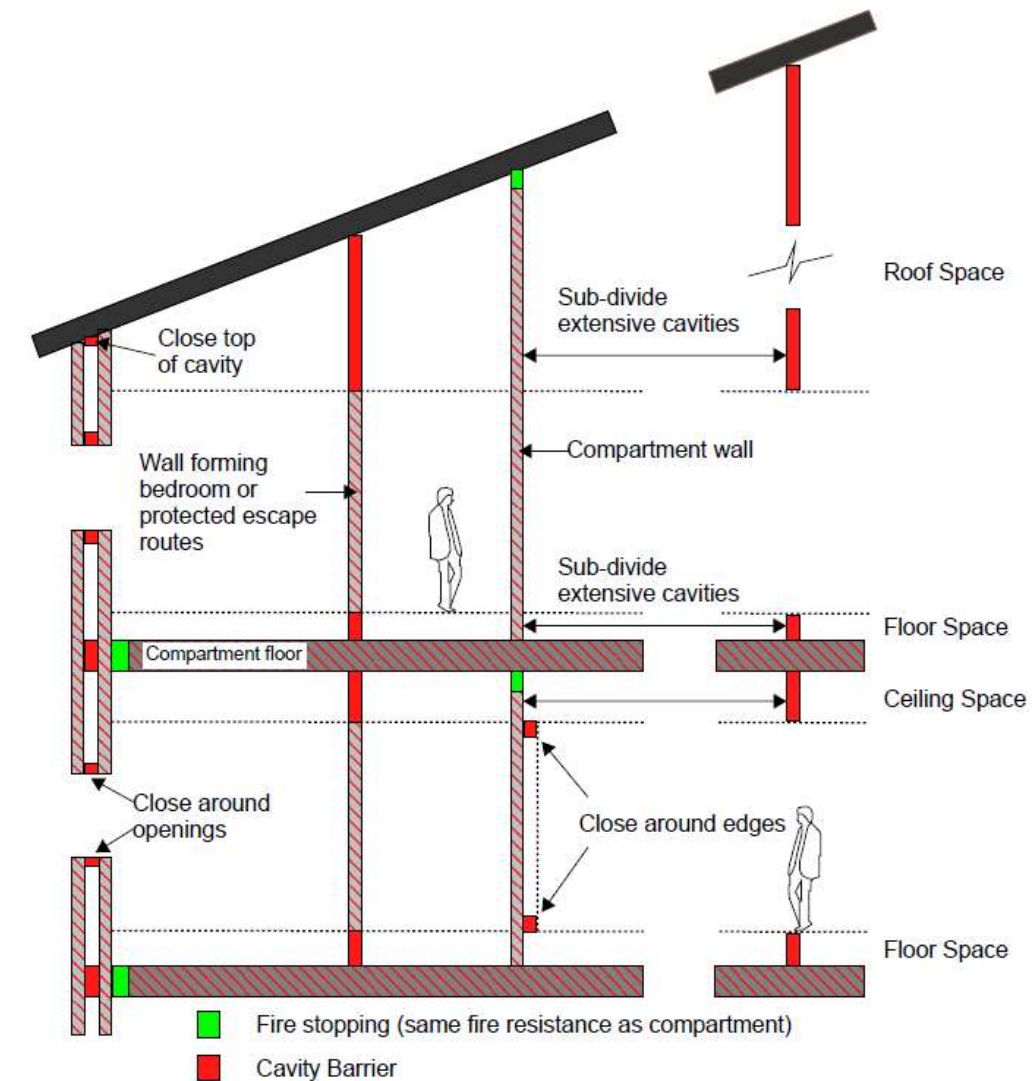


Figure 11 - Cavity barrier and fire-stopping locations

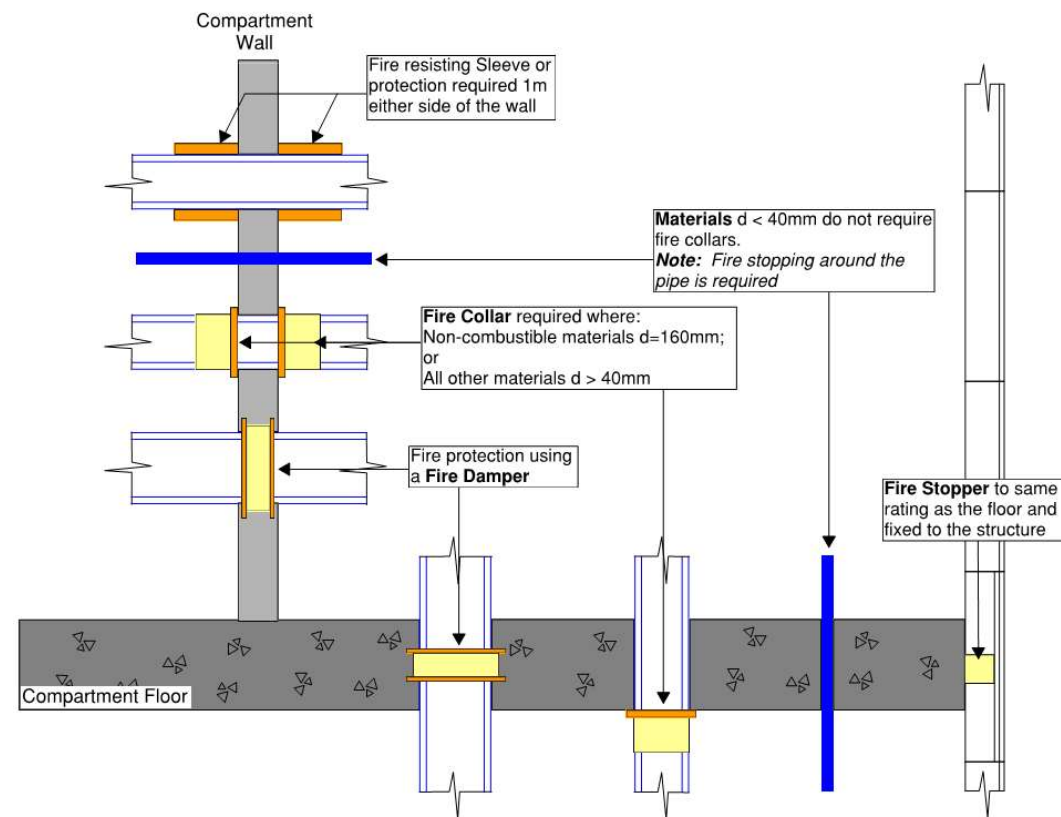


Figure 12 - Fire-stopping expectations

7. EXTERNAL FIRE SPREAD

Building Regulations requirement B4:

- “(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.
- (2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.”

7.1 External wall construction

- 7.1.1 The external wall build ups and materials will be non-combustible in compliance with paragraph B4(1) of Schedule 1 (see above) to the Building Regulations 2010. To meet this performance criterion, all materials will achieve class A2-s1, d0, considering the exemptions within regulation 7 listed below.
- 7.1.2 The building has an upper-most floor height of less than 18m, and is therefore, not classed as a ‘relevant building’ in accordance with Regulation 7(4).
- 7.1.3 The building is recommended to satisfy Regulation 7(2) required for ‘relevant buildings’, where it states: *“building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled “Fire classification of construction products and building elements. Classification using test data from reaction to fire test” (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.”*
- 7.1.4 The information in paragraph 7.1.3 does not apply to:
- Cavity trays when used between two leaves of masonry;
 - Any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;
 - Door frames and doors;
 - Electrical installations;
 - Insulation and water proofing materials used below ground level;
 - Intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
 - Membranes;
 - Seals, gaskets, fixings, sealants and backer rods;
 - Thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or
 - Window frames and glass.
- 7.1.5 The provisions of Regulation 7 apply in addition to requirement B4. Therefore, in addition to paragraph 7.1.3 above, the potential impact of any products incorporated into or onto the external walls and specified attachments should be carefully considered with regard to their number, size, orientation and position.
- 7.1.6 Particular attention is drawn to the following points:
- Membranes used as part of the external wall construction above ground level should achieve a minimum of class B-s3, d0;
 - Internal linings should comply with the guidance provided in Section 0.

- Any part of a roof should achieve the minimum performance as detailed in Section 7.2.
- As per Regulation 7 (3), window frames and glass (including laminated glass) are exempt from Regulation 7 (2). Window spandrel panels and infill panels must comply with Regulation 7 (2);
- Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break).
- Regulation 7 (2) only applies to specified attachments. Shop front signs and similar attachments are not covered by the requirements of Regulation 7 (2), although attention is drawn to the point below;

- 7.1.7 While Regulation 7 (2) applies to materials which become part of an external wall or specified attachment, consideration should be given to other attachments to the wall which could impact on the risk of fire spread over the wall.
- 7.1.8 The areas of the façade which are within 1 m from the adjacent boundary or are protected to meet space separation requirements (see Section 7.3) should achieve at least European Class B-s3, d2 surface spread of flame classification.

7.2 Roof coverings

- 7.2.1 Roof coverings are recommended to be resistant to fire spread where either close enough to a boundary to be at risk of ignition from a fire in other buildings or where needed to avoid fire spread between compartments via the roof covering.
- 7.2.2 Roof coverings are to meet the recommendations of Table 10. Roof coverings may constitute several materials (but does not include the roof structure as a whole). Therefore, the top covering material should be considered in tandem with the substrate(s) to assess the performance of the coverings.
- 7.2.3 The relevant test and classification standards for the external fire performance of roof systems is BS EN 13501-5 [33] (European Class).
- 7.2.4 Where photovoltaic panels are provided on the roofs, these should either also be in accordance with these recommendations or should meet suitable alternative guidance.

Table 10 - Limitations on roof coverings

Distance from relevant boundary	National Class	AA, AB or AC	BA, BB or BC	CA, CB or CC
	European Class	B _{ROOF} (t4)	C _{ROOF} (t4)	D _{ROOF} (t4)
Less than 6m		ü	û	û
At least 6m		ü	ü	û
At least 20m		ü	ü	ü

7.3 Space separation and unprotected areas of the façade

- 7.3.1 Should a fire occur in a building, heat will radiate through non-fire resisting openings in the external walls. This heat can be enough to set fire to nearby buildings. To reduce the chance of this occurring,

the Building Regulations place limits on the area of the external elevation with no fire resistance, known as the unprotected area.

7.3.2 The relevant boundaries are the reference point at which the potential for fire spread, being:

- the site boundary;
- a notional boundary created on the centreline of an adjacent carriage way.

7.3.3 In accordance with BS 9991 and BS 9999 guidance, only small unprotected areas in an otherwise protected façade do not contribute to the extent of unprotected area. These are shown in Figure 13.

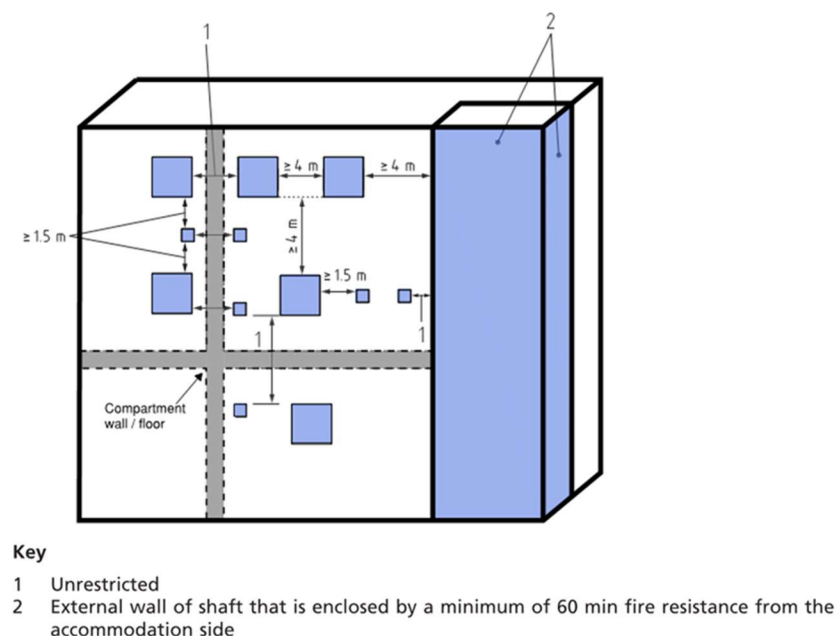


Figure 13 - Exclusions from unprotected area calculations

7.3.4 Considering the guidance of BR 187 [34], taking the benefit from sprinklers into account, an analysis of the available distance between the building and the relevant boundaries has been conducted, as indicated in Figure 14.

7.3.5 Where external walls are within 1m of a relevant boundary they should have a fire resistance equal to the structural fire resistance of the Block, i.e. 90 minutes in respect of integrity and insulation. The areas in Figure 13 may still be unprotected.

7.3.6 Where walls are greater than 1m from the relevant boundary and require fire resistance as a result of the unprotected area analysis, it should have a fire resistance of 90 minutes in respect of integrity and 15 minutes insulation. External walls should also maintain the required structural fire resistance, as appropriate. The areas in Figure 13 may still be unprotected.

7.3.7 The findings of this analysis for the worst-case compartments at each façade, are presented in Table 11. Following BR 187, this utilises the lower emitted radiation of 84 kW/m² for residential occupancies and communal, office and café spaces. The emitted radiation of 168 kW/m² is used for plant rooms and high risk areas. These tables calculate the percentage of the façade required to be of fire-resisting construction based on the available separation distances.

7.3.8 A floor to soffit height of 3m has been used for ancillary areas and 2.6m for residential units. These calculations will need to be reviewed in the following design stages.

7.3.9 The calculations also consider that sprinklers are present throughout and are designed with an enhanced system. The minimum design discharge density should be increased to 4 mm/min for single head operation, or 2.8 mm/min through each sprinkler operating simultaneously up to a maximum of two sprinklers in a single area of operation.

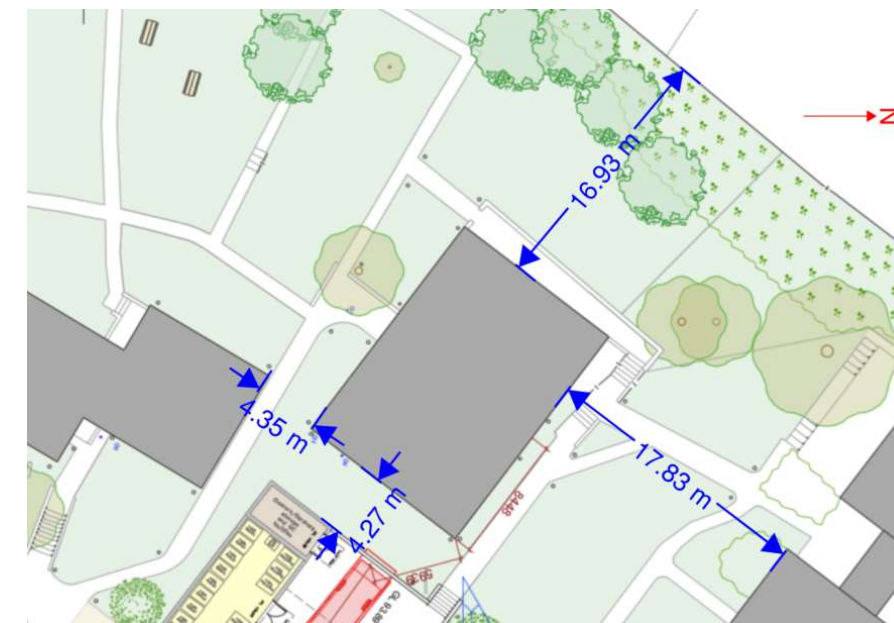


Figure 14 - Separation distances

7.3.10 Table 11 shows the calculation results for the different external walls on all Blocks.

Table 11 - Summary of external fire spread assessment

Floor	Area	Elevation	Distance to boundary (m)	Radiation intensity [kW/m²]	Enclosing rectangle [m]		Permitted unprotected area
					W	H	%
New floors	Flats on South- east elevation	SW	4.3	84	8	2.6	100
		SE	4.2	84	12	2.6	100
	Flats on North-west elevation	NW	16.9	84	12	2.6	100
		NE	17.8	84	8.4	2.6	100
Note: The external fire spread assessment for the roof plant space will be carried out once the design of the roof is developed in the future design stages.							

8. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE

8.1 Overview

- 8.1.1 In the event of fire, the fire and rescue service (FRS) will be notified by a resident, member of staff, member of the general public or a 'Redcare' or similar monitoring agency (if provided).
- 8.1.2 The development has a top storey of less than 18 m above ground. As such, a fire-fighting shaft will not be provided in addition to the single protected stair.

8.2 Vehicle access to and around the site

- 8.2.1 Fire and rescue service vehicle access will be facilitated via Great North Road. The site firefighting access routes and facilities are shown indicatively in Figure 15.
- 8.2.2 Access will be provided to a hardstanding located approximately 22m to the firefighting shaft and protected stair via the internal site route.
- 8.2.3 The access route will provide access for a pump appliance to within 18m and within clear sight of dry riser inlets in the fire-fighting core.
- 8.2.4 The access routes for the fire appliances should meet typical values noted in Table 12, being those dimensions recommended by London Fire Brigade in document GN29 [35]. Great North Road is an existing public road and would be expected to be capable of supporting multiple fire appliances. The client may wish to confirm this with Highways England or other bodies having jurisdiction.
- 8.2.5 The maximum reversing distance for fire service vehicles is 20 m. With access being to the public roadway only, no reversing distances or turning areas are required.
- 8.2.6 Fire access requirements are assumed to have been reviewed and satisfied by the approved Fire Access proposals granted permission by the Council last year for the estate (Permission HGY/2021/1288).

Table 12 - Typical pump-type firefighting appliance access requirements

Minimum access route specification	Dimension
Width between kerbs	3.7 m
Width between gateways	3.1 m
Turning circle between kerbs	16.8 m
Turning circle between walls	19.2 m
Clearance height	3.7 m
Carrying capacity	14 tonnes

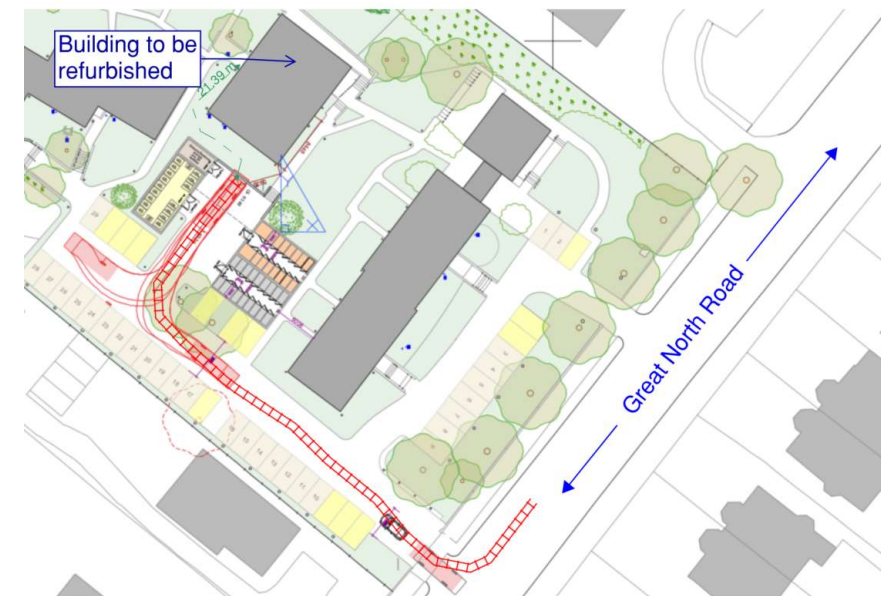


Figure 15 - Indicative firefighting access

8.3 Access into and through the building

- 8.3.1 Access to the upper floors on shall be facilitated by the main internal stair core, which includes a firefighting lift, firefighting stair and a new dry rising main.
- 8.3.2 This firefighting stair core shall be enclosed in fire-resisting construction as per [Table 7](#).
- 8.3.3 The firefighting lift should be designed in accordance with BS EN 81-1 [36] for electric lifts and BS EN 81-2 for hydraulic lifts plus the general provisions within BS EN 81-72 [37].
- 8.3.4 BS 9991 and BS 9999 recommend that dry fire mains should be provided such that every part of every storey is no more than 60m from a dry-riser outlet located in a firefighting shaft or buildings protected with an automatic suppression system.
- 8.3.5 A new dry riser fire main will be provided in the stair core.
- 8.3.6 The dry fire main inlets should be within 18m and within clear sight of - typically on the face of the building close to the stair entrance - the FRS vehicle parking position.
- 8.3.7 Dry fire main outlets should be located within the stairway on the full landing at each level. As the existing building and the existing stair core do not have sufficient space to locate the fire main in a full landing, it is proposed to locate it in every half-landing. This shall be discussed with the fire brigade for their acceptance; It is understood that it does not fully comply with the guidance recommendations, however, it is a clear improvement from the current conditions.
- 8.3.8 The dry fire mains will meet the recommendations of BS 9990 [38], BS 9991 and BS 9999.
- 8.3.9 All doors giving access to the interior of the building will have a minimum width of 750mm.
- Fire-fighting core design**
- 8.3.10 As discussed previously in Section 4.3.5, the firefighting core will be designed as per BS 9991 guidance requirements on the new floors, however, the existing floors have limitations in terms of space for separating the stair core from the common corridor and from the firefighting lift.

8.3.11 The figure below shows the proposed alternative arrangement for the firefighting shaft on the existing floors (GF to 5th floor). It is important to clarify that this arrangement brings enhancements in comparison with the existing conditions, where protected common corridors, an automatic openable vent (AOV) at the head of the stair and other power back-up details have been included as part of the new fire strategy.

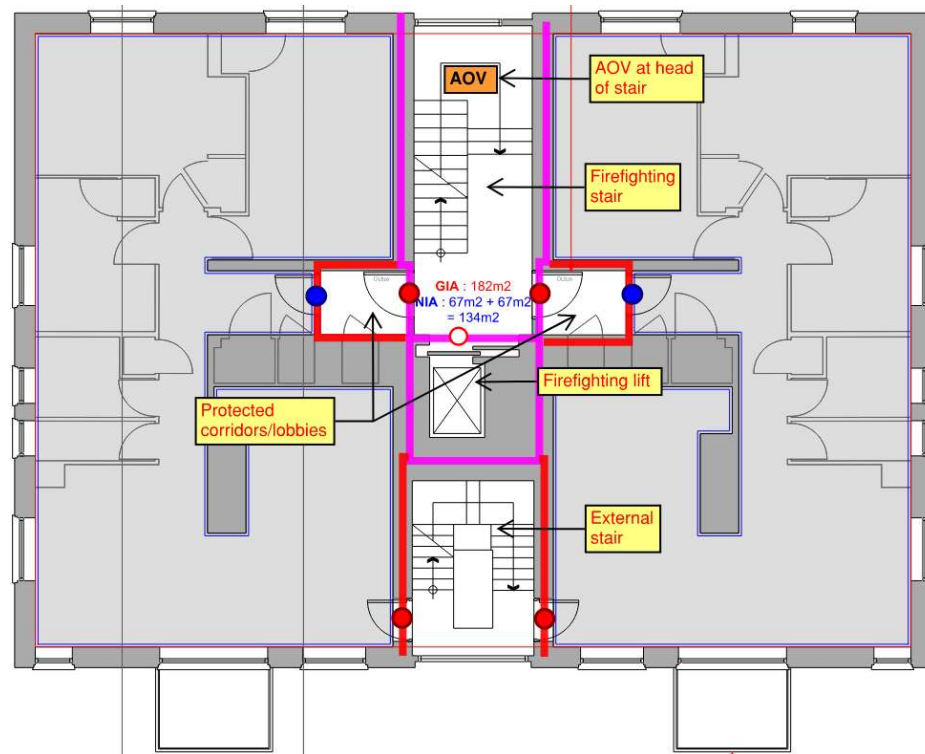


Figure 16 - Firefighting core arrangement in existing floors

8.3.12 As can be seen in Figure 16, the firefighting core design for the existing floors differ from the guidance requirements in that the firefighting lift is located in the stair enclosure on these existing floors. This arrangement shall be discussed with the fire authorities for approval as it does not comply with prescriptive requirements.

8.3.13 This alternative design mainly has implications for firefighting procedures rather than for occupants escaping procedures, as the stair core would be protected to a similar level as in a fully prescriptive arrangement. The stair core for vertical escape would still be protected from flat fires with the help of the protected common corridors (however, not ventilated).

8.3.14 Additionally, occupants would have the option to escape vertically down the secondary external stair, which will be protected with FD60S fire doors where flats open into it.

8.3.15 In Figure 16 above, the magenta lines represent 120-minute fire rated walls, the red lines 60-minute fire rated walls, the red dots 60-minute fire rated doors and the blue dots 30-minute fire rated doors. See Table 7 for further details on compartmentation.

8.4 Water supplies

8.4.1 Hydrants will be required in the vicinity of the building to support firefighting operations.

8.4.2 If the building is more than 100m from an existing hydrant, hydrants should be provided within 90m of the entry point to the building and not more than 90m apart. Where a dry-rising main is provided, the hydrants should be provided within 90m of dry riser inlet.

8.4.3 If fire hydrants are to be installed, they should be included as part of a ring fire main system. They should preferably be sited immediately adjacent to roadways or hard-standing facilities suitable for fire and rescue service appliances.

8.4.4 A water supply capable of providing a minimum of 1,500 litres per minute at all times is recommended. Water supplies will be designed and installed in accordance with BS 9990.

8.5 First-aid firefighting

8.5.1 First-aid firefighting provisions should be assessed and provided as part of the fire risk assessment for the building, including consideration for the day-to-day management of these provisions.

8.5.2 In general, fire points should be located within the ancillary areas presenting a significant fire risk and to ensure coverage of at least one fire point for every 200m² of floor area. The type and size of extinguisher(s) at each fire point should be chosen in accordance with the guidance given in BS 5306-8 [39].

8.6 Wayfinding signage for the fire and rescue service

8.6.1 Following latest amendments of ADB Vol 1 (May 2020), the residential stairs on all Blocks shall be provided with floor identification signs and flat indicator signs located on every landing of the protected stairway and every protected corridor/ lobby.

8.6.2 The text should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch. The wording used on each floor identification sign should take the form of 'Floor X', with X designating the floor number. Additionally, each floor identification sign shall be provided with information relating to the flats accessed on each storey.

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